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determining an approximate location of the object in the passenger compartment based on the first distance and the second distance;

said first and second distance calculation steps comprising the step of applying an algorithm generated by means of a neural network computer program based on the time distribution of the echo pattern of the reflected waves in order to determine the distance from the respective transducer to the object.

REMARKS

Reconsideration of the present application, as amended, is respectfully requested.

Claims 1-26 and new claims 27 and 28 are presently active in this application. Claims 11-22 have been allowed.

Claim 28 is an independent claim that essentially constitutes claim 6 rewritten in independent form. In view of the Examiner's indication of allowable subject matter in claim 6, new claim 28 should be allowable.

Claim 7 was not rejected in view of any of the cited prior art nor indicated as being allowable. In the next communication from the Examiner, clarification of the status of claim 7 is therefore respectfully requested.

Rejection in view of Corrado et al.

Claims 1-4 and 23-26 were rejected under 35 U.S.C. 102(b) as being anticipated by Corrado et al.

The Examiner's rejection is respectfully traversed as it is respectfully submitted that Corrado et al. does not disclose all of the features of these claims.

Corrado et al. describes an automotive occupant sensor system using "sensor fusion". The sensor system includes, in a preferred embodiment, an infrared sensor 24 having two detectors 21a,21b and a single ultrasonic sensor 26 (Col. 12, lines 58-66). The returns from the infrared detectors 21a,21b and ultrasonic sensor 26 are used to ascertain the type of occupant in the passenger compartment and based thereon, enable an airbag system to be controlled.

In contrast to the invention set forth in claim 1, Corrado et al. does not teach or suggest two ultrasonic transducers, i.e., two sensors of the **same** type. Rather, the sensor system of Corrado et al. requires "two or more sensors of **different** types" (emphasis added) so that the purportedly inventive "sensor *fusion* method" (emphasis added) is operable (Col. 6, lines 56-67). In other words, in order to provide any sensor "fusion" in accordance with Corrado et al., it is required that different sensors are present, e.g., an infrared sensor and an ultrasonic sensor as in the preferred embodiment.

As such, two sensors of the same type are not taught or suggested by Corrado et al. Indeed, it does not appear that sensor fusion according to Corrado et al. would be effective if two sensors of the same type were used, e.g., two ultrasonic sensors as set forth in claim 1, since there would not be any "fusion" according to the description of such in Corrado et al. (Similarly, with reference to new claim 27, this claim recites that the first, second and third sensors are of the same type, e.g., all three are ultrasonic sensors.)

Furthermore, Corrado et al. does not disclose two ultrasonic transducers arranged such that an axis connecting the transducers is substantially parallel to an axis traversing a volume in the passenger compartment above a seat in which the object is situated as now set forth in claims 1 and 23.

In sum, Corrado et al. does not disclose a sensor system including multiple sensors of the same type, and specifically ultrasonic sensors (claim 1), and a particular arrangement of sensors relative to the passenger compartment (claims 1 and 23) and therefore does not anticipate the inventions set forth in claims 1 and 23.

Claims 2-4 depend on claim 1 and include all of the limitations thereof and claims 24-26 depend on claim 23 and include all of the limitations thereof. For the same reasons that claims 1 and 23 should be allowable over Corrado et al., claims 2-4 and 24-26 should also be allowable over Corrado et al.

Rejection in view of Takahashi et al.

Claims 1, 4, and 8 were rejected under 35 U.S.C. 102(e) as being anticipated by Takahashi et al.

The Examiner's rejection is respectfully traversed.

Takahashi et al. describes an airbag apparatus for a passenger seat including two or more ultrasonic sensors used for various purposes, e.g., occupant-detecting sensor 42 and approach-detecting sensors 44,50,56. The distance between the sensor and the detected object is used to ascertain whether an airbag is deployed. In particular, the distance is compared with set values L1, L2, L3 and L5 and based thereon, deployment of the airbag may be suppressed (see Figs. 2, 4 and 6).

In contrast to the invention set forth in claim 1, in Takahashi et al., there is no determination of an approximate location of the object in the passenger compartment based on the distances between the sensors and the objects. Although the sensors determine the distances, these distances are not used in any manner to determine the location of the object. Rather, based solely on the distances with respect to reference values, airbag deployment is controlled.

Furthermore, Takahashi et al. does not disclose two ultrasonic transducers arranged such that an axis connecting the transducers is substantially parallel to an axis traversing a volume in the passenger compartment above a seat in which the object is situated as now set forth in claim 1.

Thus, Takahashi et al. does not disclose all of the features of claim 1 and cannot anticipate the invention set forth in claim 1.

Claims 4 and 8 include all of the features of claim 1 and for the same reasons that claim 1 should be allowable over Takahashi et al., claims 4 and 8 should also be allowable.

Rejection in view of Steffens, Jr. et al.

Claims 1, 2, 4, 5, 23 and 24 were rejected under 35 U.S.C. 102(b) as being anticipated by Steffens, Jr. et al.

Steffens, Jr. et al. describes an apparatus for controlling an actuatable occupant restraint device including three occupant position sensors 80,84,86 and a controller 24 that determines the position of the occupant relative to each sensor (Col. 3, lines52-61). The position of the occupant relative to the deployment door 150 of the airbag can thus be determined (Col. 3, lines 61-66). Sensor 80 is arranged in the dashboard or instrument panel 82 of the vehicle, sensor 84 is arranged in the back portion 40 of the seat 32 and sensor 86 is arranged in the side door.

In contrast to the inventions set forth in independent claims 1 and 23, none of the sensors 80,84,86 are arranged on a ceiling of the vehicle and relative to another sensor "such that a first axis connecting the first and second [sensors] is substantially parallel to a second axis traversing a volume in the passenger compartment above a seat in which the object is situated." This aspect is described in the specification at, e.g., page 17, lines 15-18.

The positioning of the sensors or transducers in the invention along such an axis provides unexpected and unobvious advantages over the prior art arrangements of transducers. As explained in detail in the specification at pages 19-23 and with reference to Fig. 9, by positioning the transducers in specific locations relative to one another and to the seat, it is possible to enhance the performance of a neural network trained on the reflected waves from objects situated on the seat and thereby improve the determination of the location of the object and its identification, e.g., for the purpose of controlling airbag deployment.

In Steffens, Jr et al., the sensors 80,84,86 are not arranged in the same manner as in the claimed inventions and therefore cannot obtain the same advantages as the claimed inventions.

Thus, Steffens, Jr. et al. does not disclose all of the features of claims 1 and 23 and as a result, does not anticipate the inventions set forth in claims 1 and 23.

Claims 2, 4 and 5 include all of the features of claim 1 and claim 24 includes all of the features of claim 23. For the same reasons that claims 1 and 23 should be allowable over Steffens, Jr et al., claims 2, 4, 5 and 24 should also be allowable.

Rejection in view of Corrado et al. and Takahashi et al.

Claims 9 and 10 were rejected under 35 U.S.C. 103 as being unpatentable over Corrado et al. in view of Takahashi et al.

Claims 9 and 10 include all of the limitations of claim 1 and for the same reasons that claim 1 should be allowable over each of Corrado et al. and Takahashi et al., claims 9 and 10 should also be allowable over the combination thereof. That is, Corrado et al. does not disclose having multiple sensors of the same type. Thus, regardless of whether it would have been obvious to utilize a ceiling mounted transducer, as purportedly taught by Takahashi et al., in the sensor

system of Corrado et al., the resultant sensor system would not include multiple sensors of the same type, one of which is arranged on the ceiling of a vehicle.

In view of the changes made to the claims and the arguments presented above, it is respectfully submitted that the Examiner's rejections of the claims have been overcome and should be removed and that the present application is now in condition for allowance.

If the Examiner should determine that additional changes to the claims, or changes to the specification, are necessary to place the application in condition for allowance, the Examiner is respectfully requested to contact the undersigned to discuss the same.

An early and favorable action on the merits is earnestly solicited.

FOR THE APPLICANTS
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